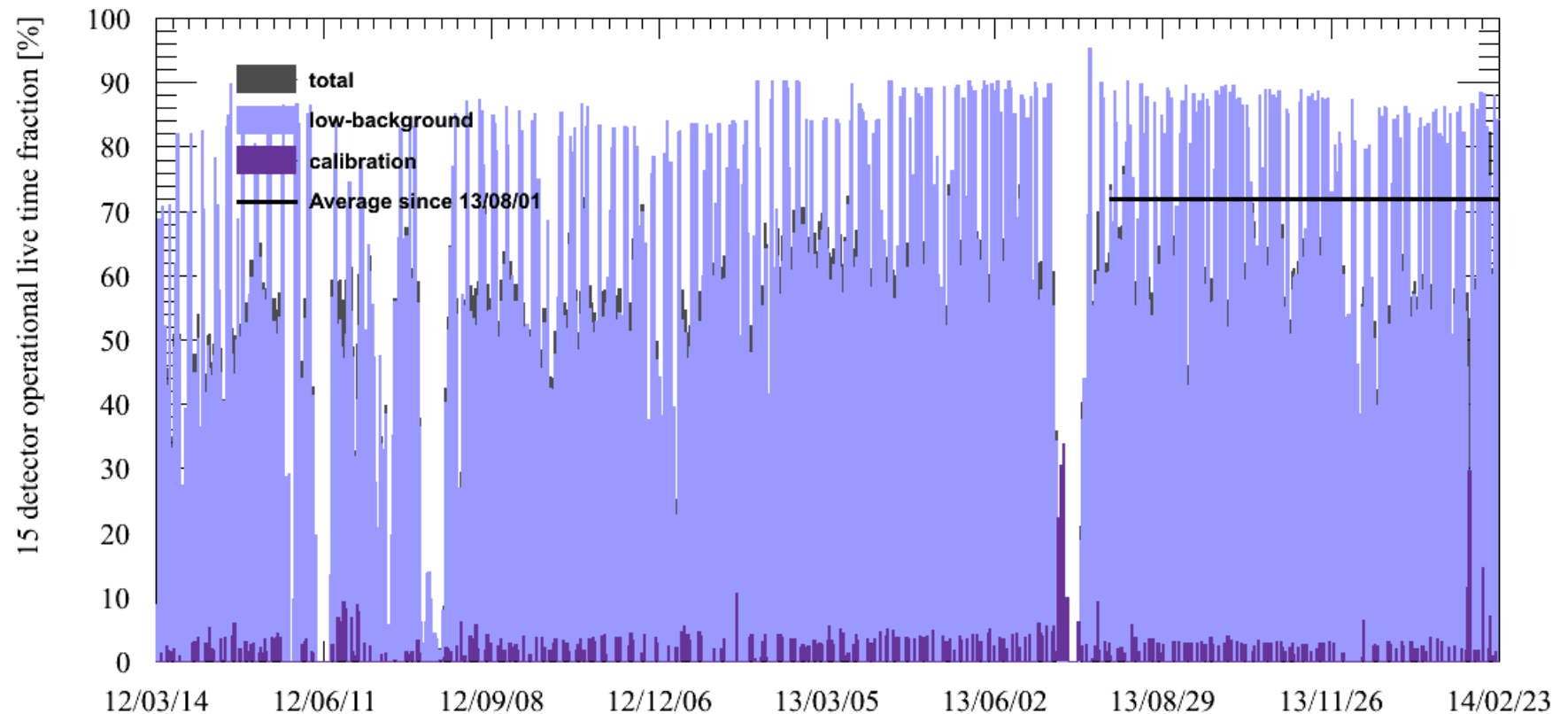


Cosmic Frontier Experiment Status

February 24, 2014

Experiment	Location	Status	Start of operations	Nominal end of operations	Physics
SuperCDMS	Soudan	Operating	Mar 2012	Mar 2015?	Dark Matter
COUPP/PICO 2L	SNOLAB	Operating	Dec 2013	Dec 2014?	Dark Matter
COUPP/PICO 60	SNOLAB	Operating	June 2013	Dec 2015?	Dark Matter
Darkside 50	LNGS (Gran Sasso)	Operating/ Calibrating	Jan 2014	Dec 2016?	Dark Matter
DAMIC	SNOLAB	Operating	Dec 2012	Dec 2014	Dark Matter
Dark Energy Survey	CTIO, Chile	Operating	Sep 2013	Feb 2018	Dark Energy
Pierre Auger	Argentina	Operating	2008	2015 (for FNAL)?	High Energy Cosmic Rays
Holometer	Meson Lab	Commissioning	Spring 2014	2015	Spacetime

SuperCDMS Soudan



Contributions to the dead-time include:

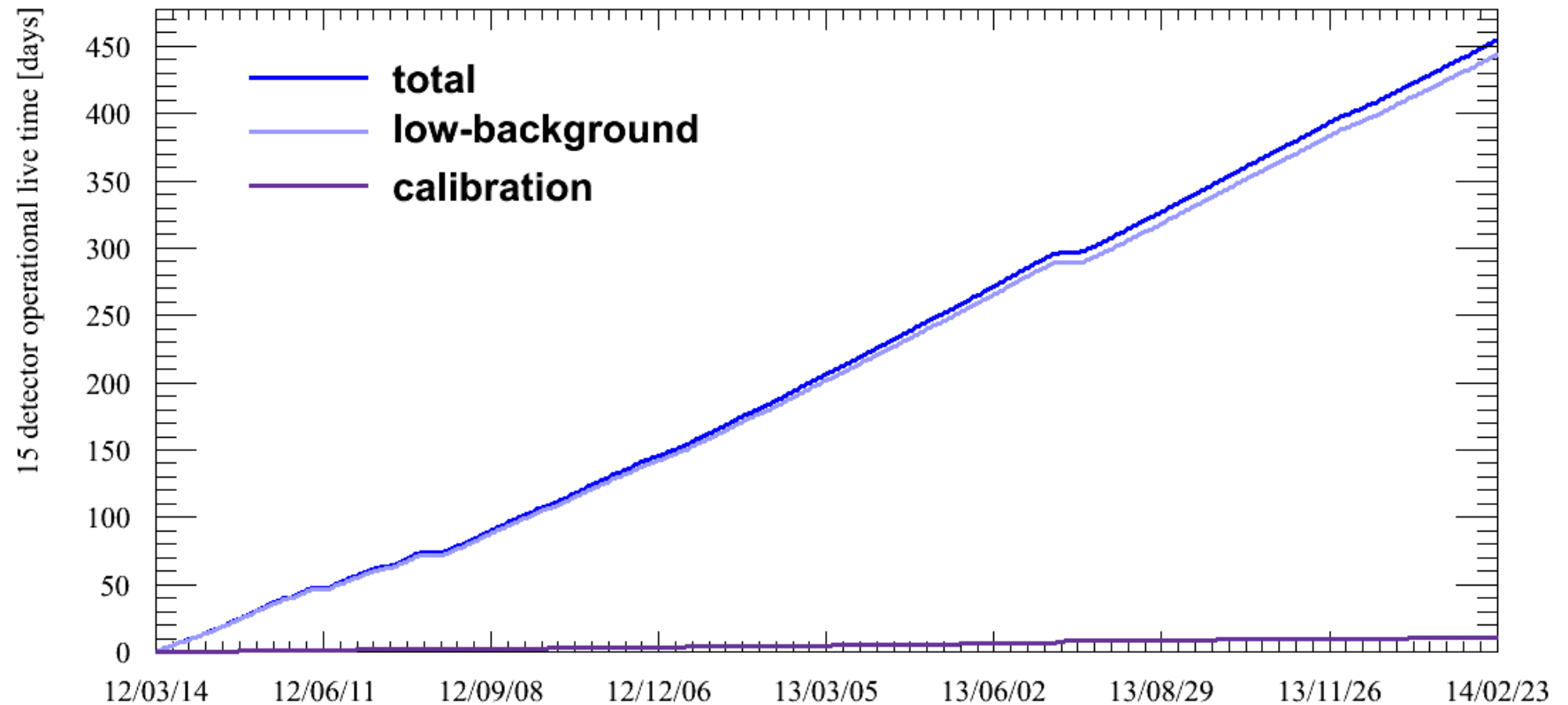
- 10% due to calibration with gamma and neutron sources

- 10% to maintain detector charge collection

- 5-8% for maintenance and special data sets

Full recovery of all cryogenics with reliquefiers minimizes cryo deadtime

SuperCDMS Soudan



Integrated live time (days) since beginning of operations

Detector mass is approximately 9 kg Ge, so exposure =11.3 kg-years

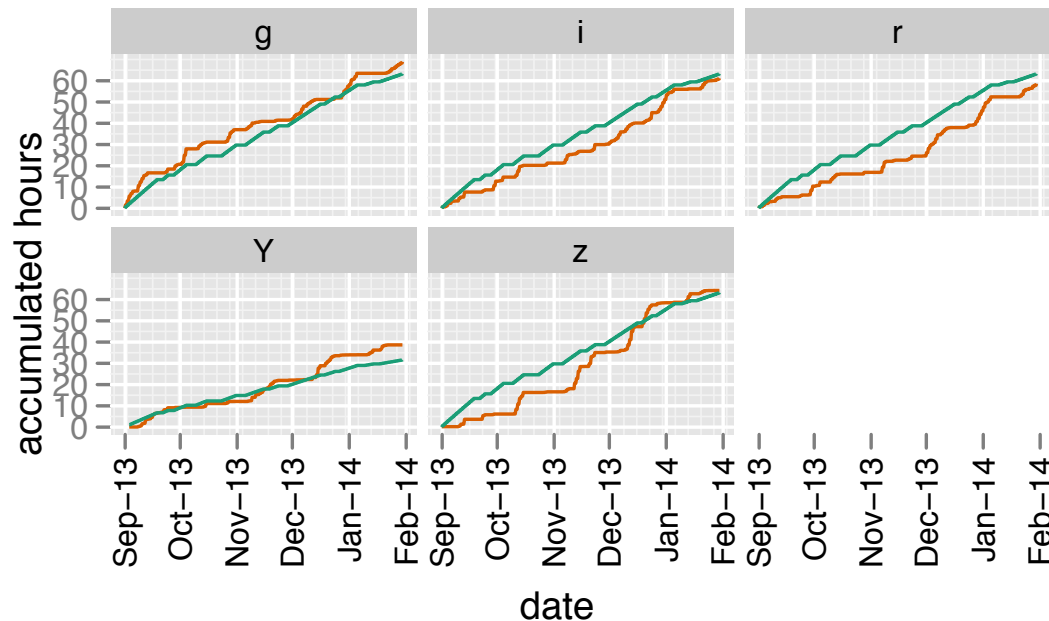
Dark Energy Survey

Activity	% this month	% of year 1
Observing time	98.1	84.0
Engineering	0	0
Bad weather	0	10.7
Telescope issues	0	2.1
DECAM issues	1.9	2.9
Observer error	0	0.3

Operational statistics from Tom Diehl

This marks the end of the 1st observing season

DES Wide-Area Survey Progress

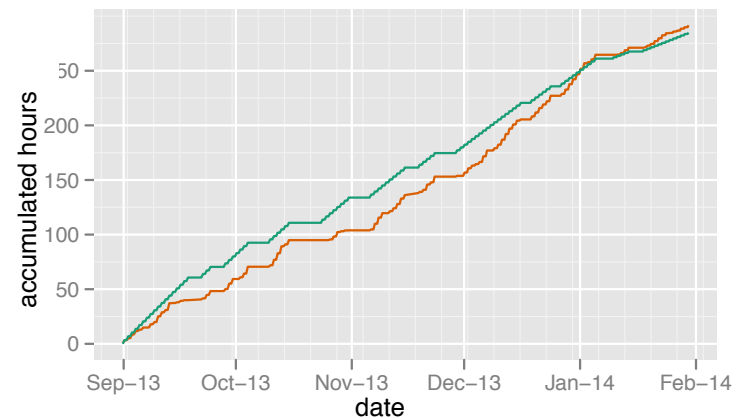


Green: target to complete 1st year of survey, assuming constant efficiency

Red: actual

Completed ~82% of the desired Year 1 footprint exposures and about 17% of the Year 2 footprint exposures

Will need to optimize Year 2 to achieve the overall goals for the first two years of the survey



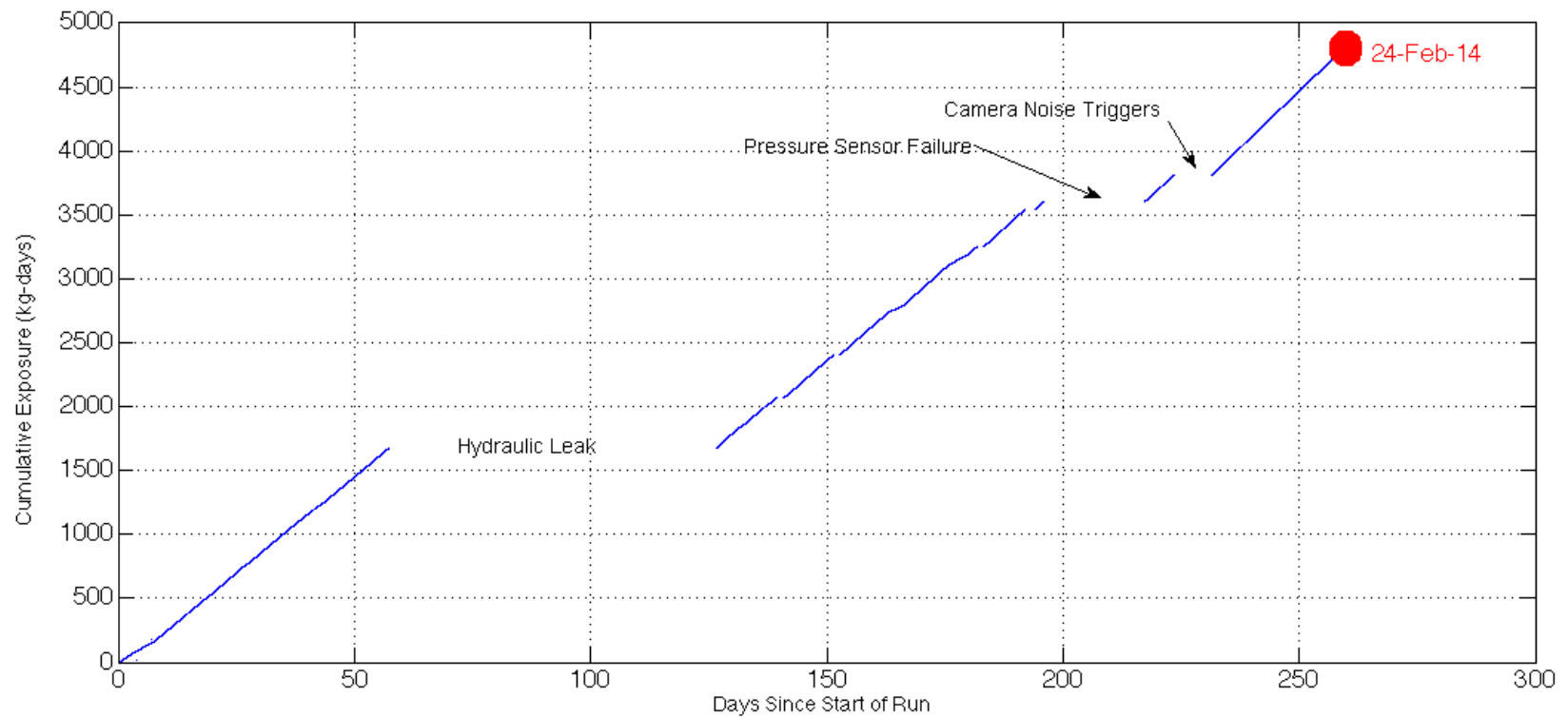
All filters combined

COUPP/PICO Operations Summary

COUPP-60 and PICO-2L runs are continuing, with the following issues:

- COUPP60 excess video noise in one camera.
 - Lost 7 days of data taking.
 - Camera was removed from trigger until it can be replaced.
 - Off-line image processing being modified to deal with noisy video data.
- PICO2L acoustic sensor failures
 - Only 1 of 3 sensors still working.
 - Causes are being investigated.
- PICO2L hydraulic leak
 - Caused pause in data taking over weekend 22-23 Feb
 - Back on line this morning.

COUPP-60 Exposure Vs. Time



Holometer Commissioning Status

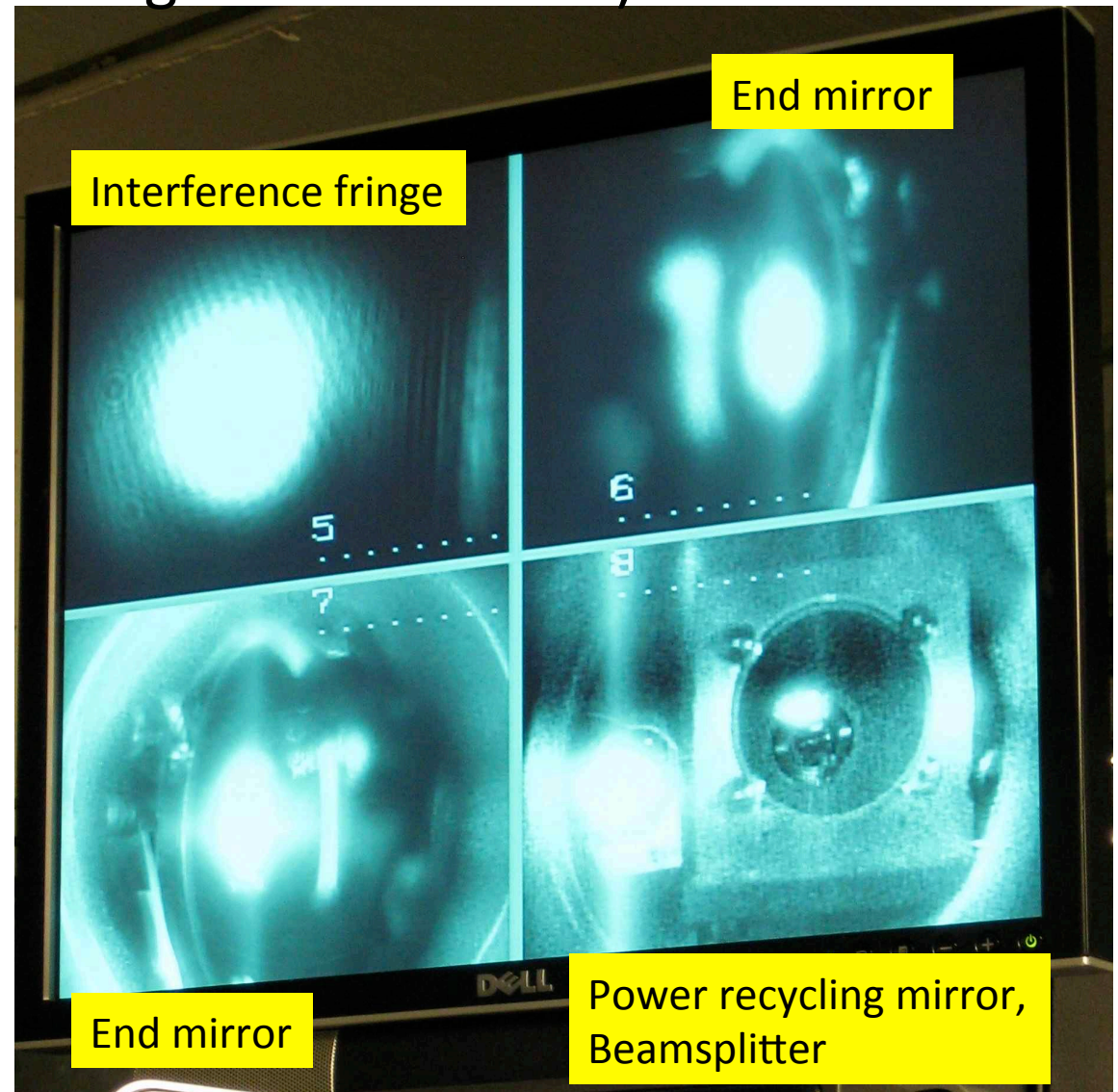
(where the signal is the noise)

1) Both interferometers operating at design luminosity of 1.15kW. (Injected 1.15W beam is recycled 1000 times inside the cavity.)

Current control system work:

- automated lock acquisition
- improving stable operations beyond ~10 minute lock

2) Data acquisition system is operating at design noise sensitivity.



2/24/2014

Holometer (E-990) Commissioning Status:

Beam halo now under control

Astigmatism in optics causes mismatched size in the two beams returning from the two interferometer arms. This produces a halo of non-interfering leakage light. The “junk light” adds shot noise but does not carry signal.

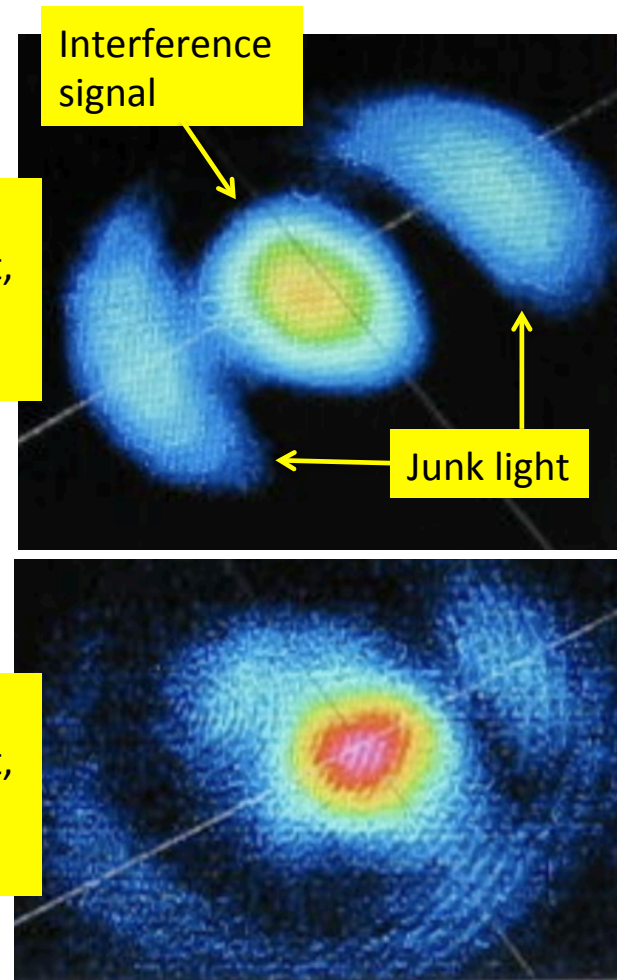
New optics were installed with 3-point, indium-based mounting to avoid geometric distortion of the mirrors.

Halo light reduced by a factor of 10. New value is well within the design specs.

Last(?) remaining commissioning task:
Improve beam stability against seismic noise.

Before new optics mount, leakage halo = 560ppm

After new optics mount, leakage halo < 56ppm

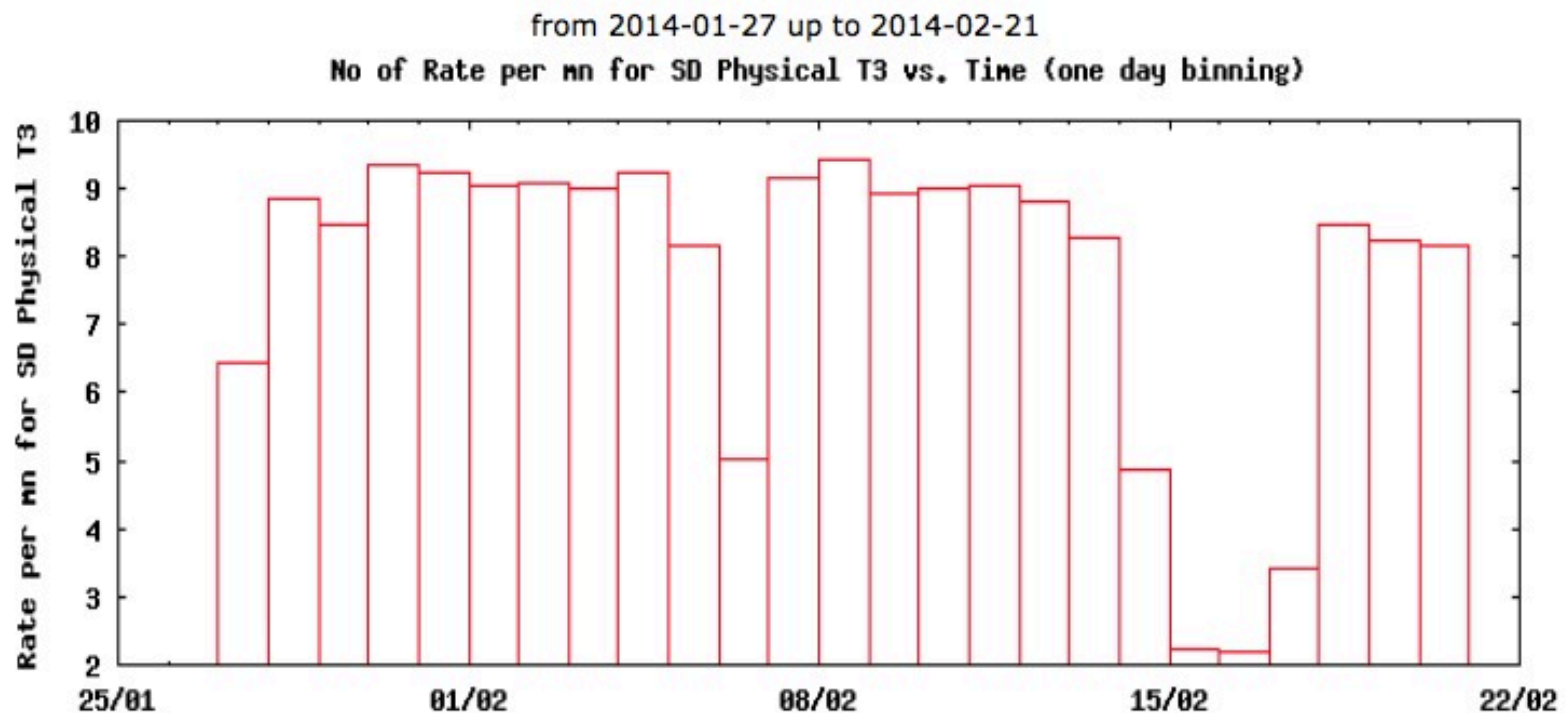


Pierre Auger Observatory

Activities of the past month

- SD efficiency: 91% in the past month, on-going maintenance.
- Recent FD observation period: Jan24 - Feb 8 2014: no error, smooth running
next shift: Feb 23 - March 10 2014
- 1 new PhD in Feb 2014 (total: 209 PhDs since inception)

❖ Number of triggers from cosmic rays ($E > 10^{18}$ eV) per minute ~ 12000 / day



DarkSide-50 Status



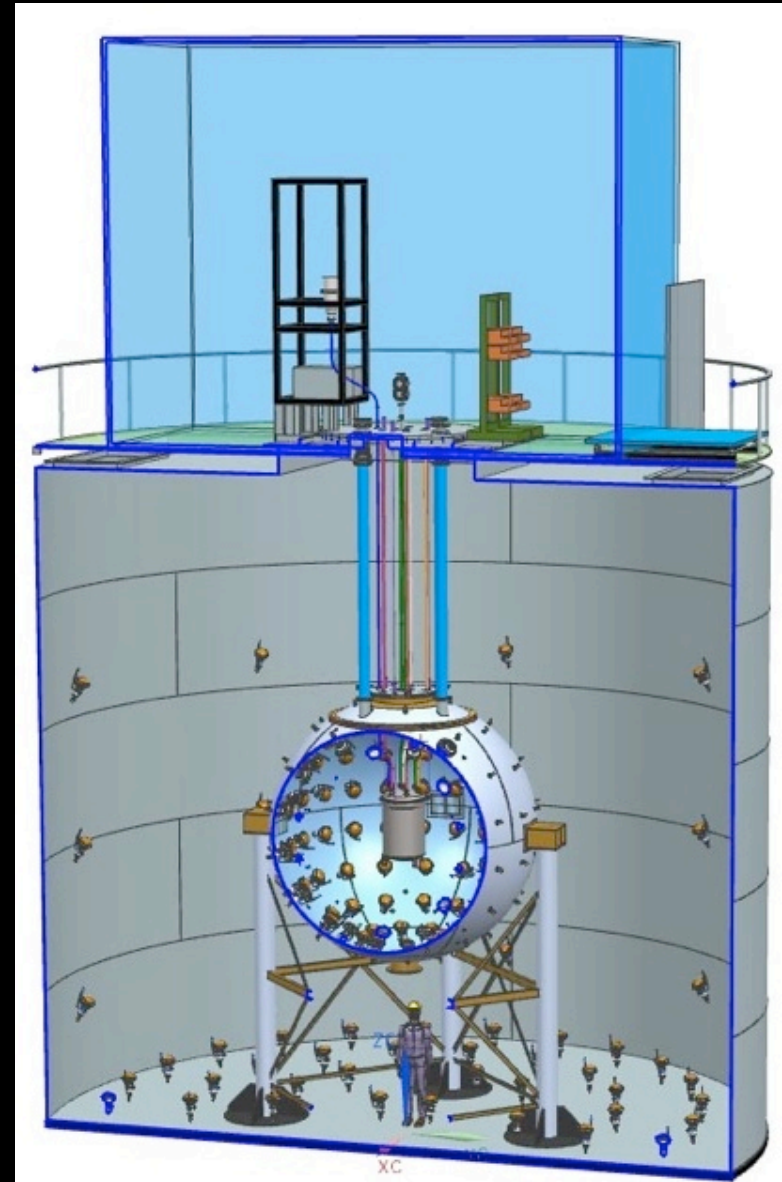
Detectors Operating – 275 kg x day

High Statistics study of ^{39}Ar rejection
(equivalent to 3 yr DS-50 run)
 $> 3 \times 10^7$ events analysed

Reconstruction on Fermigrid

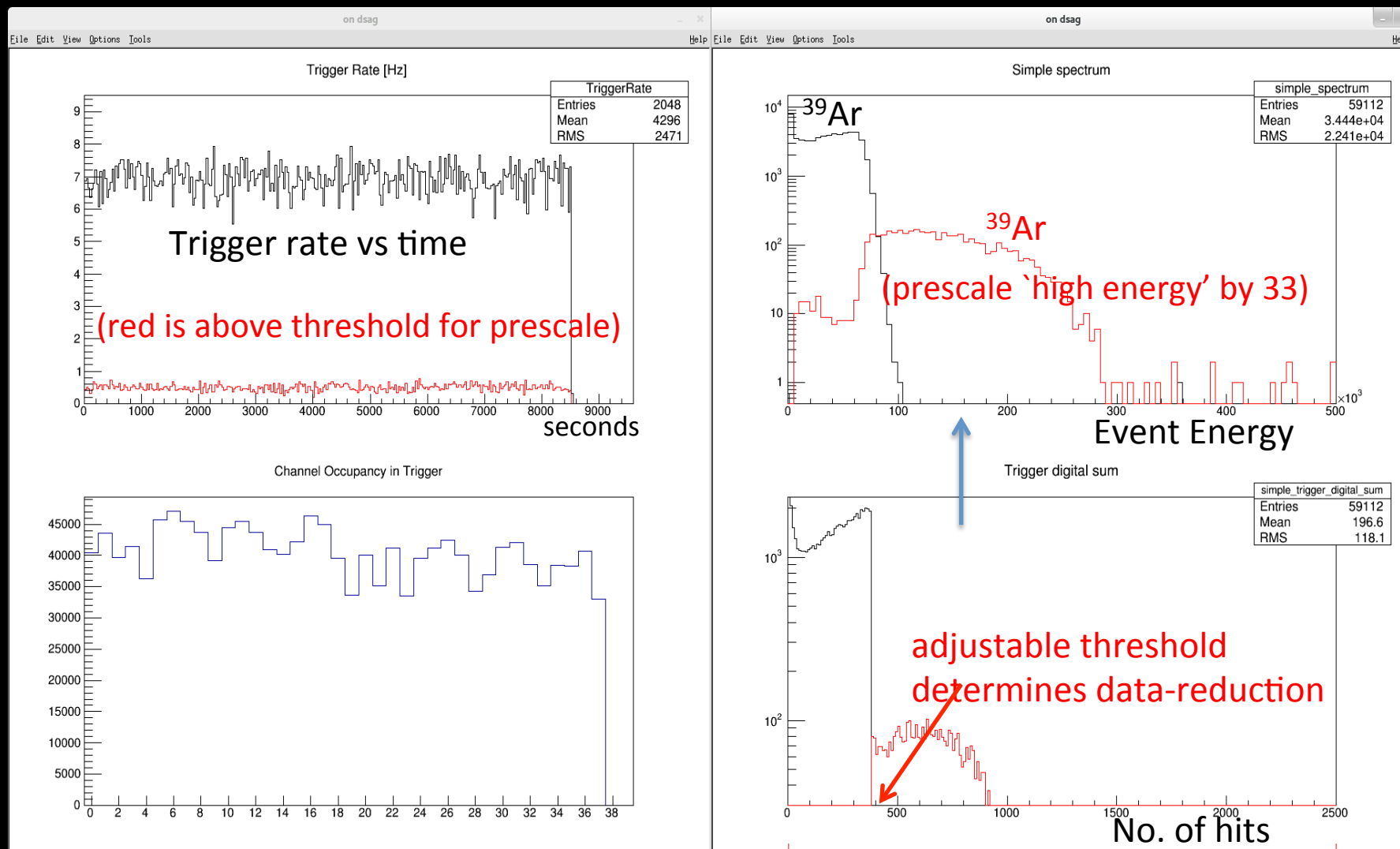
Smart Trigger implemented.
Prescales 'high energy' events based on
number of individual pulses from PMTs
in S1 window. (7 TB/day \Rightarrow \sim 2 TB/day)
(B. Baldin, PPD – EED)

135 TB transferred to FNAL



Smart-trigger: from the Online Monitor

Trigger rate dominated by ^{39}Ar decays



prescale high energy ^{39}Ar events (too high for WIMP candidates) by counting hits in S1 window

DAMIC – Dark matter with CCDs (learning how to reduce backgrounds)
(FNAL, UChicago, UMich, Mexico, Argentina, Paraguay, Zurich)

- No update provided this month
- Upcoming plans:
- Fall 2013
 - Developed a [ceramic free CCD package](#)
 - LBNL provided [thicker CCDs](#) (x5 the mass of a DECam CCD)
 - Packaged 6 detectors on ceramic free modules.
- February 2014
 - Installation of new modules at SNOLAB
 - [~10g of active mass with no ceramic](#)
 - [Expect a factor of 50 reduction in background](#)

DAMIC-100 detector order in place for a 100g array [DECam only 70g =]. If prototype packages demonstrate success -> 100g detector in operation during 2014 to probe CoGent/CDMS region... and even lower DM masses.

Pretty Picture of the Month

DES Image of an SPT Cluster shows strong lensing

